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Mentalese in Persons with Visual Impairment from a Qualitative Viewpoint

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Abstract

The purpose of the paper is to provide an insight into the qualitative aspects of visual impairment. The main area of our research are perception, imagination and mental representations. What is the form of mental representations in people with visual impairment? Mental representations in people with visual impairment are created with respect to biological, psychological and social changes. The visual impairment affects the form of mentalese of the persons and it changes with respect to the biological, mental and social aspects. We used qualitative research, especially the descriptive design (description of the phenomenon) and the comparative design (comparison of data). – The term qualitative research with its subjectivity means the attitude into the subject. It does not mean the exact opposite of objectivity. A comparison of two cases revealed characteristics which are individual in each case. However, it also showed the repetitive patterns in perception of persons with visual impairments. Their imagination depends on the etiology of visual impairment and its progression. Imagination is also dependent on psychological and social specifics. Persons with visual impairment use mental representations in their everyday life for orientation and mobility, study, work, during their leisure time. The imagination potential of a child, adult or elderly person with visual impairment should be supported by an appropriate learning environment.

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Keywords: person with visual impairment, mental representation

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Introduction

Holism as an approach to an impaired individual means to consider not only the ecological and biological dimension, psychological and spiritual approach, social and cultural sphere, but also the technical and information dimension. The ability of a person with visual impairment to create mental representations is thus dependent on a number of factors. The issue involves cooperation of experts in many disciplines – cognitive psychology, neuroscience, sociology, cultural anthropology, computer science, cartography, education, special education, etc. From a special education perspective, the primary focus is on the visually impaired person with an emphasis on lifelong development and education. The life of an individual with visual impairment as experience, perceived reality or representation is also a philosophical topic and a practical-theoretical phenomenon. In the context of addressing the main area of research of the dissertation we formulated questions concerning perception, imagination and mental representations in persons with visual impairment. The relativity of the approach and the need for a detached view is an integral part of our research and preliminary survey, which is presented below. The paper outlines particularly the forms of mental representations of a person with visual impairment from a qualitative point of view.

1. Person with visual impairment and sensory perception in a holistic concept

For more than 150 years, visual impairment has been described in a variety of contexts, from the perspective of medical, economic, and educational blindness, in the concepts of functional blindness, partial blindness, low vision, and expressions such as visually defective, visually handicapped, visually impaired (visually disabled), visually limited. In recent decades, efforts to reduce the diversity of terminological expressions have reflected in a tendency to use the term impairment (disability). A considerable discrepancy between various countries concerns the definition of special needs, and types of difficulty. Some publications on the topic of education include the following terms: students having difficulty, students having impairment, students with disabilities, difficulties, disadvantages. The terminology is designed to support special educational needs, according to which visual impairment is conceived (Florian, McLaughlin, 2013). Conceptual inconsistencies result not only from different perspectives of an impaired individual, but also from certain translation differences. The language aspect and translation issue was, inter alia, emphasised by a Marxist-feminist-deconstructionist literary theorist and professor at Columbia University in New York Gayatri Chakravorty Spivak (2014) at a round table on 4 November 2014 at University of Paris 8. Spivak's publications are translated into many languages, however, the author herself pointed out that expert texts and their terminology were not always correctly translated. Scientists reveal this fact during joint debates, conferences, round tables, and lectures, where professional and lay confrontations take place.

As stated by Majerová (in Ludíková et al., 2013), a person with visual impairment is an entity for a professional – a unity, physically understood organism with an internal environment including mass (physical body, its disruption, impairment), energy (work performing and energy consuming organism, system with a biochemical and physical dimension), and information (genetically and otherwise understood information, also cell memory). This unity with its internal environment is confronted with the outer environment also including mass (physical and natural world, which surrounds an individual with own principles), energy (ability of mass to perform work), information (coded data in the surrounding environment). From this perspective, a visually impaired person and the state of such person's visual analyser is a set or a system of material (physical), energy and information potential (Figure 1). From this perspective, the biological structure of the visual analyser, brain and the nervous system should be considered at all mentioned levels. An individual with visual impairment has certain information limitations of the visual system. Šikl (2012) adds that numerous existing forms of energy spread through the environment and can get in touch with a human body. These energies always carry potential information about the properties of the surrounding world. However, under usual conditions a vast majority of them are not registered by human senses because the signal is contained in energy (X-ray, high-frequency radiation associated with nuclear fission, energy outside detectable zone).

It should be added that an individual with visual impairment is not a technical term for us but rather a person characterized by a certain condition of the visual analyser and methods of processing information; further text speaks particularly of an individual with a loss of sight (Majerová, in Ludíková et al., 2015).

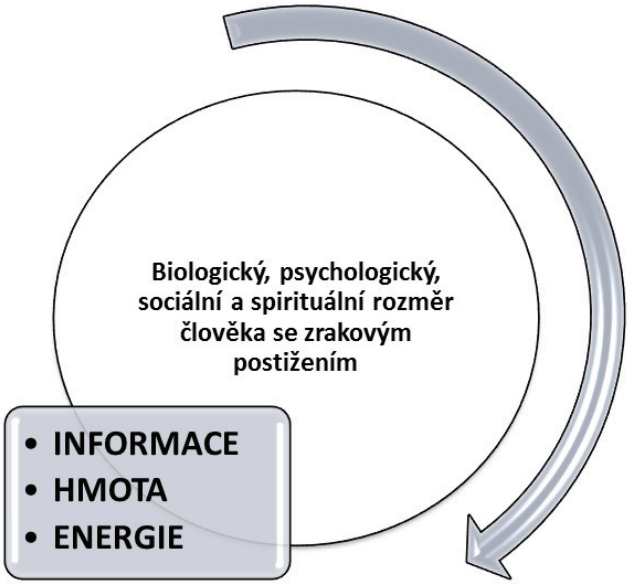

Fig. 1.

Following the question of information processing, Barasch (13) notes that great thinkers such as Locke, Voltaire, Condillac claimed that blind individuals, whose sight was restored, were not able to visually recognize what they had previously perceived by touch. On the contrary, Diderot thought about this philosophical question in a different way. Regardless of today's neuroscience knowledge, he spoke about transition of information from one sense to another. In his work "Lettre sur les aveugles à l'usage de ceux qui voient" (herein referred to as Lettre - Letters), there is a thought that there are not just external senses but also internal senses. Both of them have a place in our spiritual life, mental and psychological processes. The doctrine of internal senses reaches as far as Aristotle, Galen or, later on the timeline, some medieval polemics. Today, in the context of the traditional special education concept we would speak of compensatory factors and the development of remaining vision. Each group of visually impaired individuals has own needs that need not necessarily be identified as specific or special needs but rather as natural for a specific person. As outlined above, visual impairment can be viewed from both external and internal perspectives. Visual impairment refers to a person and his/her intrapsychic life, but also to the environment, where the person lives (natural, social, cultural space).

Concerning the qualitative nature of the paper, it should be added that already Aristotle in his Metaphysics postulated that the whole is more than the sum of its parts, which was "rediscovered" in the 20th century. Holistic issues have always existed, but their solution was brought by the need to address issues of structurally complex objects and processes – computers, programming languages, development of numerical methods, development of

new measuring methods, theories of limit state, new ways of information processing (Přemysl, Marek et al., 2013). The term holistic is not the only one that has resounded in the last few decades in the context of an approach to man and the civilization, another term is eco-holistic. In the context of eco-holism it is emphasized that pure holism in the concept of social sciences presents social, political and economic factors, but often does not sufficiently include the environmental criterion. An important part of the concept is the environment – society relationship, which has gradually changed during the history. The globalizing political economy, and the social and systemic origin of the degradation of the environment are terms that epitomize the current setting of today's civilization (Kutting, 2004). The planet Earth and the civilized society cannot be separate forms, but form a single life cycle that is constantly evolving. A comprehensive bio-psycho-social-spiritual approach and globalization as a multidimensional process are two sides of the same coin. A person with visual impairment is a part of a civilized society with all its phenomena. The following text describes an individual with visual impairment in the context of perceived experience and imagination, i.e. the main research areas of a dissertation by Majerová (Ludíková, Majerová, 2013).

2. Boundaries of internal representations or their absoluteness?

Perception and imagination in persons with visual impairment is the subject of numerous debates today. Psychology and neuropsychology experts try to understand this phenomenon in an experimental way and formulate a number of questions. According to Montoya (2013), the inner world of a person with visual impairment can be as rich as the inner world of sighted individuals. Although for individuals with visual impairment a very important aspect is language, it should be noted that language has some limits as well. As stated by Wittgenstein, the boundaries of human language represent the boundaries of the human world... what cannot be discussed remains in silence. There is a whole range of knowledge that exists outside language, such as the expression of art or music (melody, rhythm, tone), geometry, etc. At this point we are just a step away from the concept presented by Pinker – "mentalese". At the same time, the language of internal/mental representations need not necessarily be dependent on language (Narasimhan, 1997). Mental representations are the link between the physical, external world and the mental, internal world. Language and mental images represent the two biggest systems of representations (Mellet, 2000, in Galliano, 2013). At the same time, mental images may shape into the form of verbal descriptions, and vice versa. It can thus be stated that mental imagination of a person with visual impairment is based on verbal description as well as symbols. Apart from that, there are also conscious representations (from French – des répresentations de connaissances), which are neither image nor verbal, but meta-conscious (Galliano, 2013). Modern research should not omit the context of the research of consciousness and all mental phenomena within; therefore, in equal terms we speak of mental representations of a verbal, image and meta-conscious nature.

An analogue concept of mental images is supported by Cattaneo, Vecchi (2011), who add that images in blind individuals need not necessarily be visual in the right sense of the word, but they can take the form of an analogue signal (analogue format), which is enriched with a semantic content (semantic knowledge of an individual). In this sense, mental images in these persons are "live". The results of some studies demonstrate that blind individuals are able to visualize, as claimed e.g. by Bértolo (2005). Congenitally blind persons use the visual cortex to produce information of various kinds – tactile, somatosensitive, auditory, olfactory, or gustatory. The author is inclined to the view of Lopes da Salva, i.e. that auditory and tactile inputs can create virtual images in the brain of persons with congenital blindness, which can be detected e.g. in a dream (EEG record). Sensory modalities are used for the integration of various inputs; this also engages the visual system. In this sense, visual imagination is also possible without visual experience or visual perception. On the contrary, cases where previous visual experience shaped the form of mental images in an individual with visual impairment lead us to a comparison of published cases as presented by Sacks and Hull. The text below deals with the qualitative design with regard to the phenomena intrinsic to the issue, holism and a theoretical-critical analysis of professional resources (also see the dissertation by the author).

A Frenchman by the name Jacques Lusseyran lost his sight as a result of an accident before he was eight. As a result however, he had quite rich visual experience that he could use. In spite of this, there was a gradual change in

the previously perceived. According to Lusseyran, very shortly after had lost sight he forgot the faces of most people, the mother, the father, and stopped worrying about whether they were dark-haired, blue-eyed, etc. All of a sudden, it appeared to him that sighted individuals worry about these unimportant details too much. Sometimes, in his mind, men and women appeared even without their heads or fingers. Eventually however, his vision was started, firstly as light, a shapeless flood of blaze. According to Sacks (2010), the visual cortex was denied the supply of visual perceptions, and subsequently was spontaneously awakened (similar to the phenomenon of tinnitus or phantom limbs). In this case it was not just shapeless light but a capability of visual imagination, in which the visual cortex was activated. The internal vision and mind of Lusseyran constructed a kind of "screen", which projected all thoughts and desires – the screen was always unlimited in space and was present in every moment, everywhere... names, characters, and objects appeared in all colours of the rainbow. The question that we could ask is whether there is something that could be identified as a typical experience of a blind individual (Sacks, 2010, p. 175). As opposed to the above, in his autobiography Hull (2012) states a somewhat different experience, although he lost sight gradually and became registered blind in adulthood. About a year after he had lost vision, he experienced very lively images, which appeared to be rather hallucinations. These images were often false, even his tendency to project the images gradually started to disappear. An interesting fact is that people, who he had known before he lost sight, retained their faces in his imagination. Those people that he met after he had gone blind did not have such face. According to him, visual perceptions resembled glitter, visual perceptions were not black but grey, sometimes pink-brown to blue-grey, uneven, spotty. Contrary to the previous case, Hull describes his consciousness as an experience with internal darkness, dealing with what he touches and hears, while details and complexity disappear in his mental representations.

In relation to the possibility to use previous visual experience, it is apt to mention visual consciousness. Perry et al. (ed., 2010) compare consciousness and unconscious versus visual experience. For example, they claim that visual hallucinations are associated with visual unconscious, i.e. with a hidden activity of the visual parts of the brain. In addition, when a person opens the eyes and watches the surrounding world, he/she experiences a conscious visual experience, whether it is perception of colours, objects, motion, space (visually impaired person with remaining vision or compensatory factors). Although we mention two states: consciousness and the unconscious, we should not omit the concept of meta-consciousness referenced in foreign literature, which is understood as the third level of consciousness, in which consciousness focuses "on itself". For example, meditation training (mindfulness meditation training, mindfulness-based interventions) demonstrates a process associated with meta-consciousness and the benefits of various forms of meditation, which can help reduce stress, anxiety, and can have a number of positive effects (including a person with visual impairment and such person's functioning in the society). The difference between consciousness, unconscious and meta-consciousness can also be illustrated on an example of reading: although the eyes are directed on a text and perform eye movements, the mind might be elsewhere, meta-consciousness is associated with an ability of an individual to monitor and control own thoughts (Chin, Schooler, 2009). Various types of a conscious being represent phenomenally and qualitatively different experiences, as documented by the cases described above. A subjective sensory experience also carries an emotional content and the overall dynamic nature of the human mind. This is never only a computing system, yet perceived experience in an individual's consciousness can be viewed both in terms of quality and quantity. Neuropsychological and neurobiological observations indicate that both quantity and quality of consciousness depend on the work of specific parts of the brain. Various parts of the cortex affect the qualitative aspects of consciousness. Various conditions then determine the quantity and the quality of consciousness. In terms of quantitative aspects of consciousness, Tononi (2009) in his scientific paper progresses to mathematical calculations. In his Integrated information theory (IIT) he presents the fact that the quantity of consciousness is determined by integrated information (ϕ) generated by a complex of elements. Its quality is given by the shape in Q-space, which is specified by certain information relationships. This is a simple translation of the phenomenology into the language of mathematics, into the language of information relationships (q-arrows) in Q-space.

Phenomenological properties generated by the human brain are shaped in geometric characteristics, in this way geometry allows an insight into the issue of perception, imagination, mental images in a person with visual

impairment in the context of consciousness from a different perspective. This issue is also closely associated with artistic aspects, symmetry, perception of beauty, calculation of the so-called golden section in art or graphics adapted for visually impaired consumers, etc. The question that remains is where the boundaries of internal representations are. Although certain aspects of scientific topics might be captured only from a qualitative point of view, others remain unexpressed. The age-long struggle between the quantitative and qualitative research design is irrelevant and should become a supportive and open aspect of a comprehensive perspective with an unlimited amount of possibilities.

3. Selected aspects of research survey

In relation to the above mentioned studies and theoretical background we will outline the preliminary research of a dissertation by Majerová, which focused on the qualitative dimension of perception and imagination in persons with visual impairment. This was performed by means of qualitative questioning. Parts of the research were carried out by means of qualitative data classification and comparison of cases that reflect the differences in perception and imagination in persons with severe visual impairment. Data systematization, first order reduction and coding preceded a largely descriptive approach to the analysis (development of clusters, detecting patterns, comparisons, searching for correlations). At this point, we will consider two cases. The participants are affected by visual impairment in the form of remaining vision. The comparison will present the differences in the quality of experience, the readers will be provided with the statements of specific individuals with a loss of vision and evaluation of their situation in the area of perception and creation of images (sources of the below: Majerová, preliminary research for dissertation; presented at a seminar of EXPERICE laboratory, University of Paris 8, 3 December 2014).

Marie, 29 years old, has visual impairment from birth, remaining vision, the etiology of her visual impairment is associated with scarlet fever in her mother during pregnancy. Her statement about her own perceived experience: “My visual experience is mainly from the period of childhood, vision, although considerably waning, is still a very significant and important sense for me... in childhood my mum would describe everything... I always had an opportunity to safely touch everything, taste, listen to, experience... she bought me picture books, we sat for hours and analysed every single picture to the last detail.” Memories from childhood, i.e. perceived facts, played a very important role in the development of internal images: “I think I learned to see in this way – I don’t know how to describe and explain this, it was a wonderful link of the internal and external world and this is actually how my vision works today.” The respondent further stated that in terms of perception “the alpha and omega of all visual activities” were colours, lights and shades. A similar statement was also given by Jana, 35 years old, remaining vision, visual impairment from birth, specifically the Stickler syndrome, considerable deterioration occurred after 15 year of age. Vision is still a very important sense for this woman and she uses it as much as she can: “In childhood I acquired a lot of visual experiences... I still use those experiences to complete the images of various things. Although I acquired these experiences until 14 years of age.” Some of the memories of the perceived: “Even though my vision was worse, I did not recognize my visual impairment.” Jana was able to see slightly inaccurate outlines, landscape at a distance, houses, poles, lamps and even most obstacles, known people at a few metres.

In the process of development of internal images an important role is played by previous experience. The perceived is crucial for the development of images, their storing and recalling. The preliminary research focused on three areas – what is difficult for an individual to imagine, what is easy for an individual, and what helps develop images. For clarity reasons the data were arranged into a table. The table shows the differences and similarities given by the respondents (Table 1).

Table 1. Specifics of imagination

	Marie	Jana
Perception, imagination.	If a person is close, it is possible to perceive the colour of clothing; an important aspect is the colour of the voice. An individual develops an image.	Sometimes remaining vision is used. Voice is mostly preferred, (sound of the voice), the image is developed rather through hearing.
What is difficult to imagine.	Activities and working procedures, specific situations; meanings of postures, movements, facial expressions; everything where an individual lacks experience.	Modern aspects after defect progression, i.e. after 15 year of age (tablet, modern hairstyles, clothing).
What is easy to imagine.	Previous memories (facts about which the person heard or read).	The previously perceived (hills, previous clothing, etc.)

As seen from the phenomenological table, the development of images in these two women is dominated by previous memories, everything not associated with experience is quite difficult to imagine. A certain role is still played by remaining vision, however, hearing is dominant. The table also shows that orientation in specific situations, particularly communication ones that involve gestures, facial expressions, postures is difficult. Hull (2012) adds that the relationship between sighted and blind individuals might be a difficult one. Blind persons do not have the opportunity to communicate by means of general body language, they may use gestures, but they cannot perceive gestures of other people. It is interesting to compare what helps an individual develop images and mental representations – experience, touch, hearing and fantasy images. Changes in the images as a result of a loss of vision are also obvious from other statements of the preliminary research. In particular, statements about the content of dreams reflect the diversity, but at the same time the variability of internal representations: “After my vision deteriorated my dreams changed a bit... I want to see something well but it is still blurry.” (Jana) “As a result of a gradual loss of the visual functions my dreams have not changed at all as far as sensory content and character are concerned – richness of the colours, sounds, events and feelings.” (Marie) Therefore, the change in the images of dreaming appears purely individual, depending on many factors. As mentioned above, in a case recorded by Sacks, a man by the name Lusseyran had an ability of active visual imagination even after he had lost vision, in which his activated visual cortex, internal vision and mind constructed a kind of “screen”, which projected all thoughts – the screen was unlimited in space and was present in every moment, everywhere... names, characters, and objects appeared in all colours.

In a continuing research survey (performed in parallel by two researchers – Majerová, Malinovská), Anna (32 years old) adds the following about internal representations: “The image of a thing, what is actually the content of the concept, is rather figurative for me. It is easier for me to imagine nouns, specific things, when a word repeats in a sentence in various contexts, for example in a song.” On the contrary, it is difficult for the respondent to imagine adverbs and verbs, even in remembering. It is also difficult for Anna to imagine specific situations or interactions of

persons with respect to the images of verbs (visualization of activities, actions). When it comes to mental representations, the idea of the word concept is perceived by the respondent as “a text written on a paper with a certain meaning that induces something in an individual and causes a response”. Remaining vision clearly plays a significant role, just as previous experience, as was mentioned above. In the same questioning, Eva (22 years old) gave us answers to a few questions relating to mental representations. “I’m fortunate that I have a musical ear”. She said about herself, and she added that hearing was crucial for her in the development of images. With respect to mental representations as internal images, perception was dominated by the association between verbal concepts and specific things or events, linking concepts and words with specific things, linking words with their auditory forms. “I rather visualize the image of an object than the structure of a word.” As Eva adds, this also involves memory: “I might recall an image from a film, where a phrase was pronounced.” As we can see, remaining vision (albeit very low), previous visual experience and hearing as a compensatory factor are the preferred information channel. With respect to verbal representations it is apparently easier to imagine nouns and specific objects, rather than verbs and activities (Majerová, Malinovská, 2015; presented at a Slovak-Czech forum of doctoral students of special education in Bratislava). Image representations represent a subjective category, which can take various forms in terms of involvement of previous visual experience, richness of colours, lights, shades, outlines, but also an image of blurred vision. Internal images of a person affected by a loss of vision change with time depending on the time of occurrence of the defect, its progression, but also psycho-social specifics of the individual.

For an individual, loss of vision represents not only a change in perception and imagination but also a difficult emotional situation. Alena said: “It was very difficult for me to realize the fact of a gradually waning vision – I thought I would still be able to see objects, events and situations, and then came a surprise that put me into reality.” On the contrary, for Dana, a loss of vision was easier than life in an “institute”: “I think I’m more limited by living in an institute compared with the loss of vision, I’m unfamiliar with the images of the surroundings and life around me.” Individually subjective factors also play an important role in the issue of perception of visual impairment. Loss of vision is emotionally demanding, yet can present an “insignificant” fact compared with segregated life in an institute. Segregation, life in an institute (boarding house, home for persons with visual impairment) represents a significant restriction of information; therefore, we should acknowledge that life satisfaction and quality of life depend on the opportunities provided by the society to its citizens.

It is education that provides an opportunity for human development. Changes in and development of the learning environment support growth and transformation. The publication “Dreaming of New Schools: Inspiring Lifelong Learning through Conscious Creativity” analyses the role of conscious creativity. Creativity in lifelong learning in conjunction with cognitive and perceptual learning skills of an individual is understood as a body-mind experience (mind and body are an integrated unity). In relation to training of remaining vision, lower and higher compensatory factors in a child, pupil, student, adult or senior with visual impairment, certain specific conditions regarding the learning environment should be observed. The learning environment should constantly change and develop in order to support the growth of the learner (Benedetto, 2014). This fact should always be respected by the educator. Stimulation should be gradual and should respect the specifics of visual impairment in terms of relevant methodologies (spatial orientation, self-attendance, etc.), but with regard to appropriate innovations. Conscious creativity in lifelong education combines the aspect of human intelligence and an intuitive approach to lifelong learning.

Conclusion

Due to the plasticity of the human brain, we assume that during the life of an individual with visual impairment there might be unpredictable and individually different adaptations to such condition. This is also evident from the differences of the cases presented in this text. Selected aspects of the preliminary research could bring findings that will enrich professional literature in terms of disciplinary and inter-disciplinary sharing. Another significant contribution of the paper is to present benefits for individuals with visual impairment in various intervention areas:

training of compensatory factors and remaining vision; training in spatial orientation and independent mobility; training of tactile graphics for visually impaired individuals, etc.

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